

picking up one of the wafers from the cassette and carrying the wafer to the processing system; and

processing the wafer with the processing system.

20. (Unamended) A method according to Claim 19, wherein said processing step comprises exposing the wafer to radiation using a projection optical system.

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21. (New) A device according to Claim 1, said pod further including a flange, wherein when said pod is installed in the shielded chamber, the flange touches the shielded chamber on the surface.

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 19 and 20 having been withdrawn from consideration, Claims 1-3, 5-18 and 21 are now presented for examination. Claims 1 and 9 have been amended to define still more clearly what Applicant regards as his invention, in terms which distinguish over the art of record. Claim 21 has been added to assure Applicant of the full measure of protection to which he deems himself entitled. Claims 1 and 9 are the only independent claims under consideration.

Claims 1-3 and 5-18 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Applicant's admitted prior art and previously cited U.S. Patent 4,856,904 (Akagawa) and further in view of U.S. Patent 4,757,355 (Iizuka et al.). With regard to the claims as amended by this amendment, this rejection is respectfully traversed.

Independent Claim 1 as amended by this amendment is directed to a mini-environment pod device free to be installed in and uninstalled from a shielded chamber containing a micro-device manufacturing apparatus. In the mini-environment pod device, a cassette able to hold a substrate is transported to the apparatus and processed. A pod provides an inner space to store the cassette. The pod includes an outer surface where an electromagnetic shield is disposed and an opening. A lid fits into the pod opening. The lid provides an isolated environment in the inner space. When the pod is installed in the shielded chamber, the electromagnetic shield of the pod is in conductive relationship with the shielded chamber. When the pod is installed in the shielded chamber, the lid is removed from the pod opening along a portion of the shielded chamber and the substrate in the cassette is transported to the apparatus, the electromagnetic shield of the pod inhibits leakage of electromagnetic waves from the inside of the shielded chamber through the opening of the pod to the outside of the pod.

Independent Claim 9 as amended by this amendment is directed to micro-device manufacturing apparatus that processes a substrate. In the apparatus, a shielded chamber has an opening covered with a door. A door opener opens the shielded chamber door and a processing system contained in the shielded chamber processes the substrate in the shielded chamber. A pod stand mounts a mini-environmental pod device that is free to be installed

in and uninstalled from the shielded chamber. The pod device has a cassette able to hold the substrate being transported to the processing system and processed. A pod provides an inner space to store the cassette and has an outer surface where an electromagnetic shield is disposed and an open end. A lid fits into the open end of the pod and provides an isolated environment in the inner space. When the pod is installed in the shielded chamber, the lid is removed from the open end of the pod along with the door of the shielded chamber by the door opener and the substrate in the cassette is transported to the processing system, the electromagnetic shield of the pod inhibits leakage of electromagnetic waves from the inside of the shielded chamber through the open end of the pod to the outside of the pod.

Applicant's prior art disclosure of Fig. 10 has been cited as disclosing a cassette holding plural wafers and a pod providing an inner space to store the cassette.

In Applicant's view, Akagawa discloses a semiconductor wafer inspecting apparatus that has plural supports each adapted to support a wafer to be inspected and a feeder that feeds a wafer to each of the plural supports. The apparatus can effect accurate and rapid positioning of the wafer. In an arrangement having a left hand inspection unit and a right hand inspection unit, a pair of shields prevent electromagnetic influence of one inspection unit on the other inspection unit.

In Applicant's opinion, Iizuka et al. discloses a device for supplying masks to be used in a chamber having a wall. The device has an opening formed in the wall of the chamber, and a rotatable shelf disposed in the opening and for carrying thereon the masks. The rotatable shelf is coupled, by way of a rotational shaft, to a portion of the wall adjacent to the opening and the rotational shelf has a mask carrying portion which is rotationally

movable, about the rotational shaft, through the opening to and from the inside of the chamber and from and to the outside of the chamber.

According to the invention of Claims 1 and 9 as amended by this amendment, a pod that provides an inner space to store a cassette holding wafers is in conductive relationship with a shielded chamber when installed in the shielded chamber and a lid that is fitted in the pod opening is removed along a portion of the shielded chamber. The electromagnetic shield of the pod inhibits leakage of electromagnetic waves from inside the shielded chamber through opening of the pod to the outside of the pod when the pod is installed in the shielded chamber, the lid is removed from the opening of the pod along a portion of the shielded chamber and a substrate in a cassette is transported to the micro-device manufacturing apparatus.

The prior art disclosure of the subject application may teach the use of a pod that is attached to a chamber to isolate wafers in the pod from an outside "clean room" environment and micro-device manufacturing apparatuses that are covered with shielded metal chambers. In the prior art disclosure, however, there is no suggestion of any electromagnetic shielding on the outer surface of a prior art pod nor any suggestion of inhibiting leakage of electromagnetic waves from inside the shielded chamber through any prior art pod opening to the outside of the pod as in Claims 1 and 9.

What about
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Akagawa discloses an arrangement of two inspection units in which electromagnetic shield members may be provided at entrances to the inspection units to reduce the influence to one of the inspection units of electromagnetic noise generated in the other inspection unit. As discussed at lines 66-68 of column 6 of Akagawa, "the use of

such shield members is desirable, therefore, in case considerable electromagnetic influence is anticipated between inspection units". Akagawa therefore only teaches inserting electromagnetic shields between left and right inspection units of a wafer inspection apparatus to prevent electromagnetic radiation of one inspection unit from entering the other inspection unit. In Akagawa, the entrance for each inspection unit is covered by a shield member so that opening the entrance shown in Fig. 2 of Akagawa for transport of a wafer requires removal of the electromagnetic shielding. The Akagawa disclosure combined with the prior art disclosure of the subject application, however, fails to suggest anything about an electromagnetic shield covering the outer surface of an inspection unit (pod) to inhibit leakage of electromagnetic waves from the inside of a shielded chamber through a pod opening to the outside of the pod as in Claims 1 and 9 when a lid is removed from the pod opening and a substrate in the cassette is transported to the apparatus.

Iizuka et al. may teach rotatably supporting a rotatable mask shelf 18 on the sidewall 2 of a chamber 1 and electrically connecting a controlling circuit 28a to a pulse motor 28 to rotate the rotatable shelf. We note, however, that Iizuka et al. is devoid of any suggestion of an electrical connection between a sidewall and the rotatable shelf. Nor does Iizuka et al. in any way suggest that semi-cylindrical casing 16 and door 17 of similar shape are electrically connected to the sidewalls 2. In contrast to Iizuka et al.'s pulse motor - rotatable shelf shaft connection, it is a feature of proposed Claims 1 and 9 that the electromagnetic shield surrounding the opening is in conductive relationship with the shielded chamber when said pod is installed in the shielded chamber and the lid is removed

so that leakage of electromagnetic waves through a pod opening to the outside of the pod is inhibited.

With regard to the cited combination of prior art disclosure, Akagawa and Iizuka et al., it is not seen that the addition of Iizuka et al.'s pulse motor to rotatable shelf shaft electrical connection without any suggestion of an electrical connection between a sidewall and the rotatable shelf or housing to Akagawa's electromagnetic shields only between left and right unshielded inspection units 14 and 4 interpreted as pods which shields must be removed for transport of wafers could possibly suggest the feature of an electromagnetic shield disposed on the outer surface of a pod combined with inhibiting leakage of electromagnetic waves from the inside of a shielded chamber through a pod opening to the outside of the pod when the pod is installed in the shielded chamber, a lid is removed from the opening of the pod along a portion of the shielded chamber and a substrate in a cassette is transported to the micro-device manufacturing apparatus as in Claims 1 and 9. Accordingly, it is believed that Claims 1 and 9 as amended by this amendment are completely distinguished from any combination of the cited prior art disclosure, Akagawa and Iizuka et al. and are allowable.

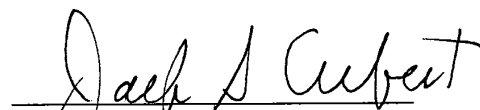
A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record. Applicant submits that the amendments to independent Claims 1 and 9 clarify Applicants' invention and serve to reduce any issues for appeal.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable consideration and reconsideration and early passage to issue of the present application. The Examiner is respectfully requested to enter this Amendment After Final Action under 37 C.F.R. § 1.116.

Applicant's attorney, Steven E. Warner, may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

1. (Twice Amended) A mini-environment pod device, said device being free to be installed in and uninstalled from a shielded chamber for containing a micro-device manufacturing apparatus for a micro-device manufacturing apparatus, [said device] comprising:

a cassette being able to hold a substrate, the substrate being transported to the apparatus and processed;

a pod providing an inner space to store said cassette, [wherein] said pod [includes an electromagnetic shield for inhibiting leakage of electromagnetic waves outside the apparatus through said pod when said pod is installed on a surface of the apparatus, and said pod is in a conductive relationship with the surface of the apparatus when said pod is installed on the surface of the apparatus] including an outer surface where an electromagnetic shield is disposed and an opening; and

a lid which fits into [an] the opening of said pod, said lid providing an isolated environment in the inner space,

wherein when said pod is installed in the shielded chamber, the electromagnetic shield of said pod becomes in a conductive relationship with the shielded chamber, and

when said pod is installed in the shielded chamber, said lid is removed from the opening of said pod along a portion of the shielded chamber, and the substrate in said cassette is transported to the apparatus, the electromagnetic shield of said pod inhibits

leakage of electromagnetic waves from the inside of the shielded chamber through the opening of said pod to the outside of said pod.

9. (Twice Amended) A micro-device manufacturing apparatus for processing [substrates] a substrate, said apparatus comprising:

a shielded chamber having an opening covered with a door;

[a mini-environment pod, having an open end, containing a cassette for holding a substrate and including a lid covering the open end, said pod being installed over the opening of said chamber, wherein said mini-environment pod has an electromagnetic shield for inhibiting leakage of electromagnetic waves outside the chamber through said pod when said pod is installed on said chamber, and said electromagnetic shield is in a conductive relationship with said shielded chamber when said pod is installed on said chamber;]

a door opener which opens the door of said shielded chamber [and the lid of said pod when said mini-environment pod is installed on said chamber]; and

a processing system, contained in said shielded chamber, which processes [a wafer] the substrate in said shielded chamber; and

a pod stand for mounting a mini-environment pod device, the pod device being free to be installed in and uninstalled from said shielded chamber and comprising:

a cassette being able to hold the substrate, the substrate being transported to said processing system and processed;

a pod providing an inner space to store the cassette, the pod
including an outer surface where an electromagnetic shield is disposed and an open end;
and

a lid which fits into the open end of the pod, the lid providing an
isolated environment in the inner space,

wherein when the pod is installed in said shielded chamber, the
electromagnetic shield of the pod becomes in a conductive relationship with said shielded
chamber, and

when the pod is installed in said shielded chamber, the lid is removed from
the open end of the pod along with the door of said shielded chamber by said door opener
and the substrate in the cassette is transported to said processing system, the
electromagnetic shield of the pod inhibits leakage of electromagnetic waves from the inside
of said shielded chamber through the open end of the pod to the outside of the pod.